S/M Code No.88-051 DATE OF ISSUE 7/1988-T

AIWA®

AD-F370,S37
AD-R470,R40

SERVICE MANUAL

• BASIC TAPE MECHANISM : X-3 • TYPE. H, U, C, E, K, G, Z

SPECIFICATIONS

Type	Stereo cassette tape deck
Track format	4 tracks 2 channels
Power supply	**AD-R470 E, Z, AD-F370 E, Z** AC 220 V, 50/60 Hz **AD-R470 K, G, AD-F370 K, G** AC 240 V, 50/60 Hz **AD-R470 C, AD-R40 U** **AD-F370 C, AD-S37 U** AC 120 V, 60 Hz **AD-R470 H, AD-F370 H** AC 110—120 V/220—240 V switchable, 50/60 Hz
Power consumption	17 W
Frequency response	METAL tape: 20—18,000 Hz CrO_2 position tape: 20—17,000 Hz NORMAL tape: 20—16,000 Hz
Signal-to-noise ratio	73 dB (METAL tape DOLBY C NR ON)
Wow and flutter	According to DIN 45 500 0.15% 0.065% (WRMS)
Tape speed	4.8 cm/sec. (1-7/8 ips)
Rewind time	90 sec. (C-60)
Fast forward time	90 sec. (C-60)
Recording system	AC bias (frequency 85 kHz)
Erase system	AC erase
Motor	DC Servomotor × 1
Head	Record/playback head × 1 (**AD-F370,S37**) Erase head × 1 (**AD-F370, S37**) Record/playback / Erase head × 1 (**AD-R470, R40**)
Inputs	LINE IN maximum input sensitivity: 50 mV (over 50 kΩ) DIN max sensitivity (Z model only): 0.3 mV/kΩ (3.3 kΩ)
Outputs	LINE OUT standard output level: 0.36 V (0 VU) (**AD-R470, R40**) 0.35 V (0 VU) (**AD-F370, S37**); suitable load impedance: over 50 kΩ; DIN standard level (Z model only): 0.36 V (0 VU) (**AD-R470, R40**) 0.35 V (0 VU) (**AD-F370, S37**) Headphones: 8 Ω—1 kΩ
Dimensions	430(W)×127.5(H)×233.4(D) mm
Weight	**AD-R470, R40** 3.3 kg **AD-F370, S37** 3.2 kg

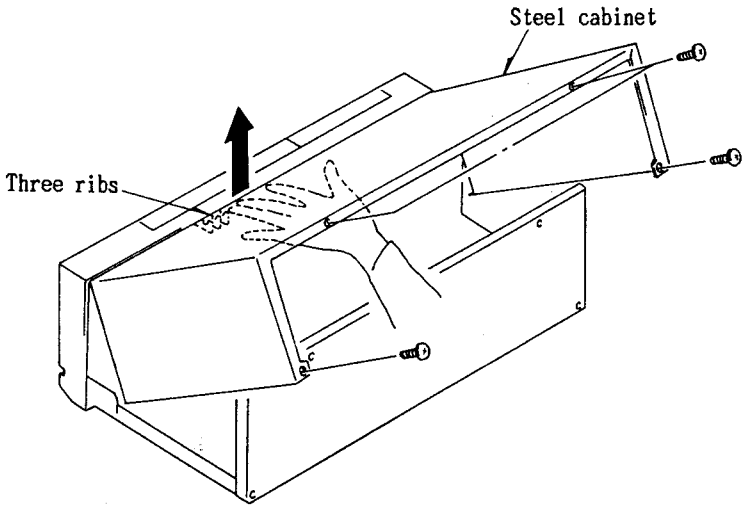
- Design and specifications are subject to change without notice.
- Dolby noise reduction and HX Pro headroom extension manufactured under license from Dolby Laboratories Licensing Corporation. HX Pro originated by Bang & Olufsen.
- "DOLBY" the double-D symbol and "HX PRO" are trademarks of Dolby Laboratories Licensing Corporation.

AIWA Co., Ltd. Tokyo Japan

Printed in Japan

DISASSEMBLY INSTRUCTIONS

1. Remove the four screws and raise the steel cabinet by approx. 45° as shown in the figure. Insert your hand from behind and raise the steel cabinet from the three-ribs block manually in the direction indicated by arrow and remove it.



ELECTRICAL MAIN PARTS LIST (AD−R470,R40, AD−F370,S37)

REF.NO.	PART NO.	DESCRIPTION
===IC===		
	87-001-143-019	IC,CX20187
	87-020-840-010	IC,ICP-N20
	87-001-164-019	IC,LB1408
	87-001-334-010	IC,LB9051A
	82-236-620-010	IC,LC6543H-3715
	87-020-680-019	IC,NJM2068S
	87-020-758-019	IC,NJM2068SD
===TRANSISTOR===		
	89-502-235-019	FET,2SK223E
	89-110-155-019	TRANSISTOR,2SA1015GR
	89-112-965-019	TRANSISTOR,2SA1296GR(C,E,K,G,Z)
	89-106-837-019	TRANSISTOR,2SA683S(H)
	89-109-521-019	TRANSISTOR,2SA952K
	89-318-156-019	TRANSISTOR,2SC1815BL
	89-318-155-019	TRANSISTOR,2SC1815GR
	89-322-405-019	TRANSISTOR,2SC2240BL(Z)
	89-331-130-019	TRANSISTOR,2SC3113
	89-413-023-019	TRANSISTOR,2SD1302S
	89-414-065-019	TRANSISTOR,2SD1406GR
===DIODE===		
	82-596-799-019	DIODE,1N4002
	87-020-465-019	DIODE,1SS133
	87-020-123-019	DIODE,DS446
	87-027-686-019	DIODE,ZENER HZ-12A1
	87-027-301-019	DIODE,ZENER HZ-3A1
	87-027-286-019	DIODE,ZENER HZ5C1

REF.NO.	PART NO.	DESCRIPTION
===MAIN CIRCUIT BOARD SECTION===		
PCB-A	*	MAIN CIRCUIT BOARD
C1	★87-010-389-019	CAP,ELECT 2200-25V SME
C2	★87-010-237-019	CAP,ELECT 1000-16V SME
C3	★87-010-565-019	CAP,ELECT 470-12V SME
C4	★87-010-263-019	CAP,ELECT 100-10V
C5	★87-010-644-019	CAP,ELECT 470-16 MUSE
C7	★87-010-263-019	CAP,ELECT 100-10V
C9	★87-010-384-019	CAP,ELECT 100-25V
C31	★87-010-405-019	CAP,ELECT 10-50V SME
C32	★87-010-405-019	CAP,ELECT 10-50V SME
C101	★87-018-121-019	CAP,CERA-SOL SS 150P
C102	★87-018-121-019	CAP,CERA-SOL SS 150P
C103	★87-018-122-019	CAP,CERA-SOL SS 180P(R470 E,K,G,Z)
C103	★87-018-124-019	CAP,CERA-SOL SS 270P(R470 H,C,R40)
C103	★87-018-125-019	CAP,CERA-SOL SS 330P(F370 H,C,S37)
C103	★87-018-039-019	CAP,CERA-SOL SS 390P(F370 E,K,G,Z)
C104	★87-018-122-019	CAP,CERA-SOL SS 180P(R470 E,K,G,Z)
C104	★87-018-124-019	CAP,CERA-SOL SS 270P(R470 H,C,R40)
C104	★87-018-125-019	CAP,CERA-SOL SS 330P(F370 H,C,S37)
C104	★87-018-039-019	CAP,CERA-SOL SS 390P(F370 E,K,G,Z)
C109	★87-018-125-019	CAP,CERA-SOL SS 330P
C110	★87-018-125-019	CAP,CERA-SOL SS 330P
C113	★87-010-405-019	CAP,ELECT 10-50V SME
C114	★87-010-405-019	CAP,ELECT 10-50V SME
C115	★87-010-405-019	CAP,ELECT 10-50V SME
C116	★87-010-405-019	CAP,ELECT 10-50V SME
C117	★87-010-384-019	CAP,ELECT 100-25V
C201	★87-018-121-019	CAP,CERA-SOL SS 150P
C202	★87-018-121-019	CAP,CERA-SOL SS 150P
C203	★87-018-132-019	CAP,CERA-SOL SS 2200P
C204	★87-018-132-019	CAP,CERA-SOL SS 2200P
C205	★87-010-404-019	CAP,ELECT 4.7-50V SME
C206	★87-010-404-019	CAP,ELECT 4.7-50V SME

REF.NO.	PART NO.	DESCRIPTION
C211	★87-018-134-019	CAP,CERA-SOL SS 0.01(R470 H,C,R40)
C212	★87-018-134-019	CAP,CERA-SOL SS 0.01(R470 H,C,R40)
C213	★87-018-197-019	CAP,CERA-SOL SS 1800P(R470 H,C ,R40,F370,S37)
C213	★87-018-199-019	CAP,CERA-SOL SS 3300P(R470 E,K ,G,Z)
C214	★87-018-197-019	CAP,CERA-SOL SS 1800P(R470 H,C ,R40,F370,S37)
C214	★87-018-199-019	CAP,CERA-SOL SS 3300P(R470 E,K ,G,Z)
C219	★87-010-404-019	CAP,ELECT 4.7-50V SME
C220	★87-010-404-019	CAP,ELECT 4.7-50V SME
C301	★87-018-131-019	CAP,CERA-SOL SS 1000P
C302	★87-018-131-019	CAP,CERA-SOL SS 1000P
C303	★87-018-122-019	CAP,CERA-SOL SS 180P
C304	★87-018-122-019	CAP,CERA-SOL SS 180P
C307	★87-018-123-019	CAP,CERA-SOL SS 220P
C308	★87-018-123-019	CAP,CERA-SOL SS 220P
C311	★87-018-131-019	CAP,CERA-SOL SS 1000P
C312	★87-018-131-019	CAP,CERA-SOL SS 1000P
C313	★87-018-134-019	CAP,CERA-SOL SS 0.01
C314	★87-018-134-019	CAP,CERA-SOL SS 0.01
C317	★87-010-263-019	CAP,ELECT 100-10V
C401	★87-018-131-019	CAP,CERA-SOL SS 1000P
C403	★87-014-118-019	CAP,PP 0.015
C405	★87-018-201-019	CAP,CERA-SOL SS 5600P
C409	★87-010-384-019	CAP,ELECT 100-25V
C410	★87-010-384-019	CAP,ELECT 100-25V
C501	★87-010-404-019	CAP,ELECT 4.7-50V SME
C502	★87-010-404-019	CAP,ELECT 4.7-50V SME
C503	★87-010-405-019	CAP,ELECT 10-50V SME
C504	★87-010-405-019	CAP,ELECT 10-50V SME
C505	★87-018-133-019	CAP,CERA-SOL SS 4700PF
C506	★87-018-133-019	CAP,CERA-SOL SS 4700PF
C507	★87-018-129-019	CAP,CERA-SOL SS 680P
C508	★87-018-129-019	CAP,CERA-SOL SS 680P
C515	★87-010-400-019	CAP,ELECT 0.47-50V SME
C516	★87-010-400-019	CAP,ELECT 0.47-50V SME
C517	★87-010-677-019	CAP,ELECT 0.15-50V SRA
C518	★87-010-677-019	CAP,ELECT 0.15-50V SRA
C521	★87-010-545-019	CAP,ELECT 0.22-50V SME
C522	★87-010-545-019	CAP,ELECT 0.22-50V SME
C531	★87-010-404-019	CAP,ELECT 4.7-50V SME
C532	★87-010-404-019	CAP,ELECT 4.7-50V SME
C651	★87-010-401-019	CAP,ELECT 1-50V
C652	★87-010-401-019	CAP,ELECT 1-50V
C653	★87-010-384-019	CAP,ELECT 100-25V
C654	★87-010-384-019	CAP,ELECT 100-25V
C801	★87-010-401-019	CAP,ELECT 1-50V
C802	★87-010-401-019	CAP,ELECT 1-50V
C851	★87-010-408-019	CAP,ELECT 47-50VX(Z)
C853	★87-018-206-019	CAP,CERA-SOL SS 15P(Z)
C854	★87-018-206-019	CAP,CERA-SOL SS 15P(Z)
C855	★87-018-127-019	CAP,CERA-SOL SS 470P(Z)
C856	★87-018-127-019	CAP,CERA-SOL SS 470P(Z)
C857	★87-010-544-019	CAP,ELECT 0.1-50V(Z)
C858	★87-010-544-019	CAP,ELECT 0.1-50V(Z)
C859	★87-010-402-019	CAP,ELECT 2.2-50V(Z)
C860	★87-010-402-019	CAP,ELECT 2.2-50V(Z)
C861	★87-018-127-019	CAP,CERA-SOL SS 470P(Z)
C862	★87-018-127-019	CAP,CERA-SOL SS 470P(Z)
C911	★87-010-565-019	CAP,ELECT 470-12V SME
C921	★87-010-565-019	CAP,ELECT 470-12V SME
C931	★87-010-402-019	CAP,ELECT 2.2-50V(R470/R40)
C932	★87-010-382-019	CAP,ELECT 22-25V(R470/R40)
C941	★87-018-113-019	CAP,CERA-SOL SS 33PF
C942	★87-018-113-019	CAP,CERA-SOL SS 33PF
C943	★87-010-401-019	CAP,ELECT 1-50V

REF.NO.	PART NO.	DESCRIPTION
C951	★87-018-114-089	CAP,CERA-SOL SS 39P
C952	★87-018-114-089	CAP,CERA-SOL SS 39P
C953	★87-018-201-019	CAP,CERA-SOL SS 5600PF
C991	★87-018-131-019	CAP,CERA-SOL SS 1000P(R470/R40)
C992	★87-018-134-019	CAP,CERA-SOL SS 0.01(R470/R40)
⚠FR1	87-029-108-019	RES,FUSIBLE J 1/2W 10
J601	★87-009-023-019	JACK PIN YKC21-0349(PLAY/LINE OUT, REC/LINE IN)
J651	★87-009-026-019	JACK DIN5P YKF51-5002(REC/PLAY)(Z)
J991	★87-049-630-019	JACK 2.5(CD SYNC)(R470/R40)
L201	★82-201-622-010	COIL 22MMH
L202	★82-201-622-010	COIL 22MMH
L203	★87-003-131-019	COIL MICRO INDUCTOR 10MMH
L204	★87-003-131-019	COIL MICRO INDUCTOR 10MMH
L301	★82-235-612-010	COIL, HX85K
L302	★82-235-612-010	COIL, HX85K
L401	★82-235-610-010	COIL,BIAS,85K,R/P(R470 H,C,R40)
L401	★82-235-611-010	COIL,BIAS,85K,R/A(R470 E,K,G,Z)
L401	★82-235-613-010	COIL,BIAS,85K,S,P1A(F370,S37)
L501	★82-234-624-019	FILTER MPX 85K
L502	★82-234-624-019	FILTER MPX 85K
L503	★82-201-622-010	COIL 22MMH
L504	★82-201-622-010	COIL 22MMH
S851	87-031-752-019	SLIDE SW(INPUT SELECTOR)(Z)
SFR101	★87-021-738-019	SFR 1K
SFR102	★87-021-738-019	SFR 1K
SFR201	★87-021-739-019	SFR 2.2K
SFR202	★87-021-739-019	SFR 2.2K
SFR301	★87-021-747-019	SFR220K
SFR302	★87-021-747-019	SFR220K
X1	★87-030-144-019	CERA-LOCK CSA4.00MHZ

===FRONT CIRCUIT BOARD SECTION===

PCB-B	*	FRONT CIRCUIT BOARD
C631	★87-010-401-019	CAP,ELECT 1-50V
C632	★87-010-401-019	CAP,ELECT 1-50V
C803	★87-010-405-019	CAP,ELECT 10-50V SME
C804	★87-015-681-019	CAP,ELECT 10-16V SRA
C805	★87-010-404-019	CAP,ELECT 4.7-50V SME
D801	87-001-123-019	LED,SLZ 981C-2(+10)
D802	87-001-123-019	LED,SLZ 981C-2(+10)
D803	87-001-123-019	LED,SLZ 981C-2(+6)
D804	87-001-123-019	LED,SLZ 981C-2(+6)
D805	87-001-123-019	LED,SLZ 981C-2(DC+3)
D806	87-001-123-019	LED,SLZ 981C-2(DC+3)
D807	87-001-124-019	LED,SLZ 381C(0)
D808	87-001-124-019	LED,SLZ 381C(0)
D809	87-001-124-019	LED,SLZ 381C(-3)
D810	87-001-124-019	LED,SLZ 381C(-3)
D811	87-001-124-019	LED,SLZ 381C(-7)
D812	87-001-124-019	LED,SLZ 381C(-7)
D813	87-001-124-019	LED,SLZ 381C(-20)
D814	87-001-124-019	LED,SLZ 381C(-20)
D815	87-001-124-019	LED,SLZ 381C(-∞)
D816	87-001-124-019	LED,SLZ 381C(-∞)
D831	87-001-123-019	LED,SLZ 981C-2(DOLBY C NR)
D832	87-001-124-019	LED,SLZ 381C(DOLBY B NR)
D843	87-001-124-019	LED,SLZ 381C(PLAY)(R470/R40)
D844	87-001-124-019	LED,SLZ 381C(►)(R470/R40)
D844	87-001-124-019	LED,SLZ 381C(PLAY)(F370/S37)
D845	87-001-124-019	LED,SLZ 381C(◄)(R470/R40)
D846	87-001-123-019	LED,SLZ 981C-2(RECORD)
D847	87-001-294-019	LED,SLZ 481C-2(PAUSE)
D848	87-001-123-019	LED,SLZ 981C-2(REC MUTE)

REF.NO.	PART NO.	DESCRIPTION
S831	87-036-135-019	SLIDE SW(DOLBY B/C NR)
S832	87-036-135-019	SLIDE SW(REVERSE MODE)(R470/R40)
S833	87-036-135-019	SLIDE SW(TIMER)
S835	87-031-893-010	TACT SW QVD04M(▶▶)
S836	87-031-893-010	TACT SW QVD04M(▶)
S837	87-031-893-010	TACT SW QVD04M(◀)(R470/R40)
S838	87-031-893-010	TACT SW QVD04M(◀◀)
S839	87-031-893-010	TACT SW QVD04M(⏸PAUSE)
S840	87-031-893-010	TACT SW QVD04M(●REC MUTE)
S841	87-031-893-010	TACT SW QVD04M(■STOP)
S842	87-031-893-010	TACT SW QVD04M(●REC)
VR451	87-024-151-019	VR,250KB(BIAS FINE)
VR631	87-024-149-019	VR,2GANG,50KA(REC LEVEL)
VR632	87-024-150-019	VR,100KB(BALANCE)

Combination circuit board A 82-235-601-019
PCB-A 82-235-602-019
PCB-B 82-235-603-019
PCB-C 82-235-604-019
PCB-D 82-235-605-019

Combination circuit board B 86-535-628-019
PCB-E 86-535-629-019
PCB-F 86-535-630-019

===JACK CIRCUIT BOARD SECTION===

PCB-C	*	JACK CIRCUIT BOARD
⚠C8	*87-019-113-019	CAP,SPARK-GAP 0.0022E
J661	*87-009-043-010	JACK 6.3(PHONES)
⚠S1	87-036-015-019	AC SW SDDLDI(POWER)

===POWER CIRCUIT BOARD SECTION===

⚠PCB-D	*	POWER,CIRCUIT BOARD
⚠PT1	82-236-603-019	POWER TRANSFORMER(E,Z)
⚠PT1	82-236-601-019	POWER TRANSFORMER(H)
⚠PT1	82-236-604-019	POWER TRANSFORMER(K,G)
⚠PT1	82-236-602-019	POWER TRANSFORMER(R470C,R40/F370C,S37)
⚠S2	87-031-780-019	SLIDE SW(AC VOLTAGE)(H)

===DECK CIRCUIT BOARD SECTION===

PCB-E	*	DECK CIRCUIT BOARD
SFR921	*87-021-966-019	SFR 4.7K(F370,S37)
SOL921	86-535-611-110	SOLENOID,X-3,PL(PLAY)
SOL922	86-535-612-110	SOLENOID,X-3,FR(FR)
SW921	87-036-110-010	PUSH SW(CR02)
SW922	87-036-040-010	PUSH SW(CST)
SW923	87-036-110-010	PUSH SW(DIR)(R470/R40)
SW951	87-036-110-010	PUSH SW(REA)
SW952	87-036-109-010	PUSH SW(MT)
SW953	87-036-109-010	PUSH SW(REB)(R470/R40)

===SENSOR CIRCUIT BOARD SECTION===

PCB-F	*	SENSOR CIRCUIT BOARD(R470/R40)
CP951	87-001-367-019	PHOTO SENSOR STI-315-05CD(R470/R40)

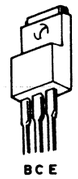
===MISCELLANEOUS===

⚠	*82-187-797-019	AC CORD(E,Z)
⚠	*82-187-795-019	AC CORD(G)
⚠	*87-034-749-019	AC CORD(H)
⚠	*82-187-796-019	AC CORD(K)
⚠	*87-034-583-019	AC CORD(R470C,R40/F370C,S37)
⚠	*87-085-199-010	CORD BUSHING 2271
EH	87-046-196-019	E.HEAD(F370/S37)
M921	87-045-296-019	MOTOR
RPEH	87-046-324-019	RPEH(R470 H,C,R40)
RPEH	87-046-289-019	RPEH(R470 E,K,G,Z)
RPH	87-046-322-019	RPH(F370 H,C,S37)
RPH	87-046-323-019	RPH(F370 E,K,G,Z)

2SA683

2SA952
2SA1015
2SA1296
2SC1815
2SC2240
2SD1302

2SC3113



2SD1406

2SK223

IC DESCRIPTION

IC, LC6543H-3715

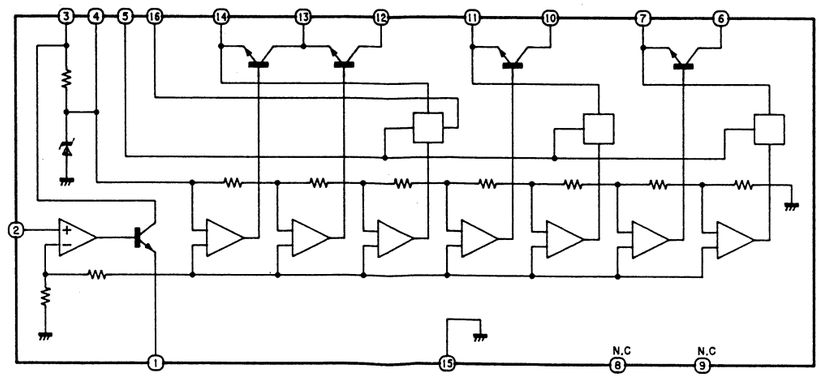
Pin No.	Pin name	Description
1	I-DIRECT	Head direction detection SW input: Low at side A.
2	VDD	Power: 4.5 to 5.5V
3	KS1	Data 0 to 5: KEY MATRIX SCAN output
4	KSO	
5	DATA5	MATRIX SCAN input and output
6	DATA4	
7	DATA3	
8	DATA2	
9	DATA1	
10	DATA0	
11	$\overline{\text{DISP}}$	Data 0 to 5: LED SCAN output
12	O-LMT	LINE MUTE control: Goes low in PLAY, CUE, REV, REC, REC & PLAY, REC & PAUSE, and RMT modes.
13	O-$\overline{\text{BIAS}}$	Bias oscillation control: Oscillated in low. Goes low in REC mode and high in reverse mode.

KS1="L"	KSO="L"	DISP="L" lights in low
key ▶▶	key STOP	LED PLAY
key ▶	key REC	LED ▶
key ◀	key Timer Rec	LED ◀
key ◀◀	key Repeat Timer PLAY	LED REC
key ⏸	key ↻	LED ⏸
key RMT	key ⇄	LED RMT

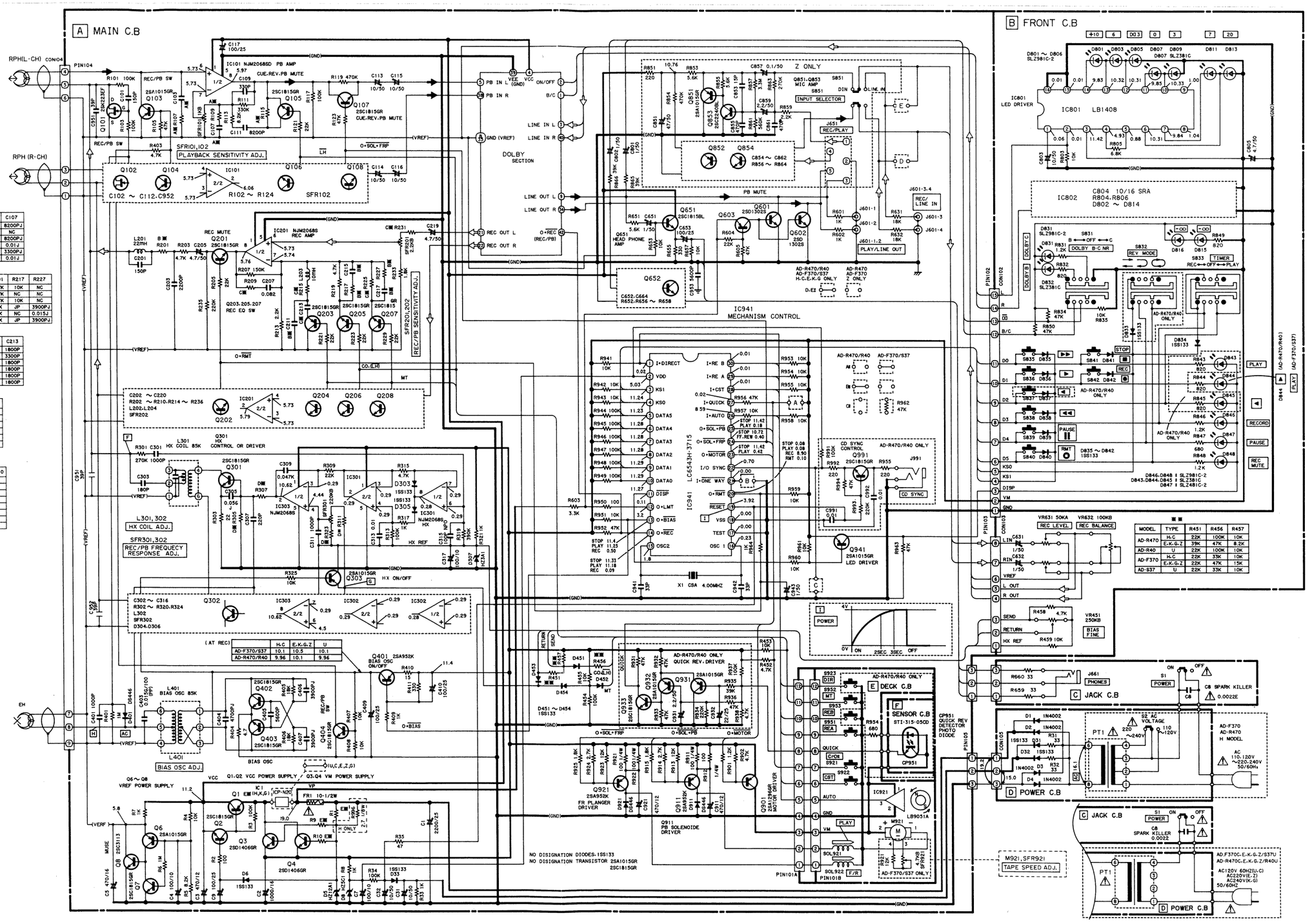
↻ Indicates a CD sync in reverse mode for AD-R470/R40.

Pin No.	Pin name	Description
14	O-$\overline{\text{REC}}$	Dolby IC REC/PB selection: Enters the REC mode in low.
15	OSC-2	Clock input
16	OSC-1	Clock input
17	TEST	Test pin: 0V
18	VSS	Power: 0V
19	$\overline{\text{RESET}}$	Reset control
20	O-$\overline{\text{RMT}}$	REC MUTE control: Goes high in REC & PLAY mode and low in reverse mode.
21	I-$\overline{\text{ONE WAY}}$	MODE selection: Low using AD-R470/R40 Open/high using AD-F370/S37.
22	I/O SYNC	CD SYNC input and output: CD SYNC with CBRS. A low signal is output in REC's QUICK REV mode. When recording is started in low, the set is put into the PAUSE mode.
23	O-$\overline{\text{MOTOR}}$	Mechanism power control: A motor is rotated in low. Mechanical switch, quick sensor, and auto stop sensor are then activated.
24	O-$\overline{\text{SOL·FRP}}$	FRP solenoid control: Controlled in low
25	O-$\overline{\text{SOL·PB}}$	PB solenoid control: Controlled in low
26	I-AUTO	Reel pulse input: Two pulses are input when a take-up reel (at side A) is rotated once. When the input is not changed for more than 4 seconds in PLAY mode and for 0.5 seconds in FF/REW/CUE/REV mode, auto stop is done.
27	I-QUICK	Quick sensor input: Quickened in high. Eight-second input after the mode is changed from FWD PLAY to REV PLAY or PLAY to PAUSE requires no adjustment.
28	I-CST	Cassette detection SW input: Goes low during cassette insertion.
29	I-RE A	Accidental erasure protection SW input (at side A): Can be recorded in low.
30	I-RE B	Accidental erasure protection SW input (at side B): Can be recorded in low.

IC BLOCK DIAGRAM-1 IC, LB1408



SCHEMATIC DIAGRAM—1 (AD—R470,R40, AD—F370,S37)



A ✱

MODEL	TYPE	R107	R109	R115	C103	C107
AD-R470	H,C	JP	1.2K	6.8K	270P	8200PJ
	E,K,G,Z	22K	NC	6.2K	180P	NC
AD-R40	U	JP	1.2K	6.8K	270P	8200PJ
AD-F370	H,C	JP	2.2K	6.8K	330P	0.01J
	E,K,G,Z	JP	4.7K	6.8K	390P	3300PJ
AD-S37	U	JP	2.2K	6.8K	330P	0.01J

B ✱

MODEL	TYPE	C211	C215	C217	R201	R217	R227
AD-R470	H,C	0.01J	0.015J	NC	4.7K	10K	NC
	E,K,G,Z	0.0082J	NC	NC	4.7K	NC	NC
AD-R40	U	0.01J	0.015J	NC	4.7K	10K	NC
AD-F370	H,C	0.01J	3300PJ	3900PJ	10K	JP	3900PJ
	E,K,G,Z	0.01J	NC	0.015J	10K	NC	0.015J
AD-S37	U	0.01J	3300PJ	3900PJ	10K	JP	3900PJ

C ✱

MODEL	TYPE	R225	R215	R209	R231	C213
AD-R470	H,C	10K	270	33K	15K	1800P
	E,K,G,Z	18K	220	33K	15K	3300P
AD-R40	U	10K	270	33K	15K	1800P
AD-F370	H,C	10K	220	39K	10K	1800P
	E,K,G,Z	NC	220	33K	12K	1800P
AD-S37	U	10K	220	39K	10K	1800P

D ✱

MODEL	TYPE	R305	R307	R311	R323
AD-R470	H,C	1.8K	8.2K	220K	100K
	E,K,G,Z	1.2K	6.8K	220K	JP
AD-R40	U	1.8K	8.2K	220K	100K
AD-F370	H,C	1.8K	8.2K	47K	100K
	E,K,G,Z	3.9K	18K	47K	100K
AD-S37	U	1.8K	8.2K	47K	100K

E ✱

MODEL	TYPE	Q1	R1	R9.R10
AD-R470	H	2SA683S	560 1/2W	220
	C	2SA1296GR	560 1/4W	330
	E,K,Z	2SA1296GR	560 1/4W	220
AD-R40	U	2SA1296GR	560 1/4W	330
AD-F370	H	2SA683S	560 1/2W	220
	C	2SA1296GR	560 1/4W	330
	E,K,Z	2SA1296GR	560 1/4W	220
AD-S37	U	2SA1296GR	560 1/4W	330

VOLTAGE VALUE

F AC(AT REC NO SIGNAL)

	H,C	E,K,G,Z	U
AD-F370/S37	15.5	17.6	15.5
	20.0	22.9	20.0
	28.0	27.3	28.0
AD-R470/R40	14.5	13.6	14.5
	16.1	16.2	16.1
	24.4	17.8	24.4

G (AT REC)

	H,C	E,K,G,Z	U
AD-F370/S37	LH 5.46	LH 5.27	LH 5.46
	CO 6.25	CO 6.00	CO 6.25
	MT 8.88	MT 9.21	MT 8.88
AD-R470/R40	LH 6.30	LH 6.36	LH 6.30
	CO 6.64	CO 7.00	CO 6.64
	MT 9.12	MT 9.15	MT 9.12

H

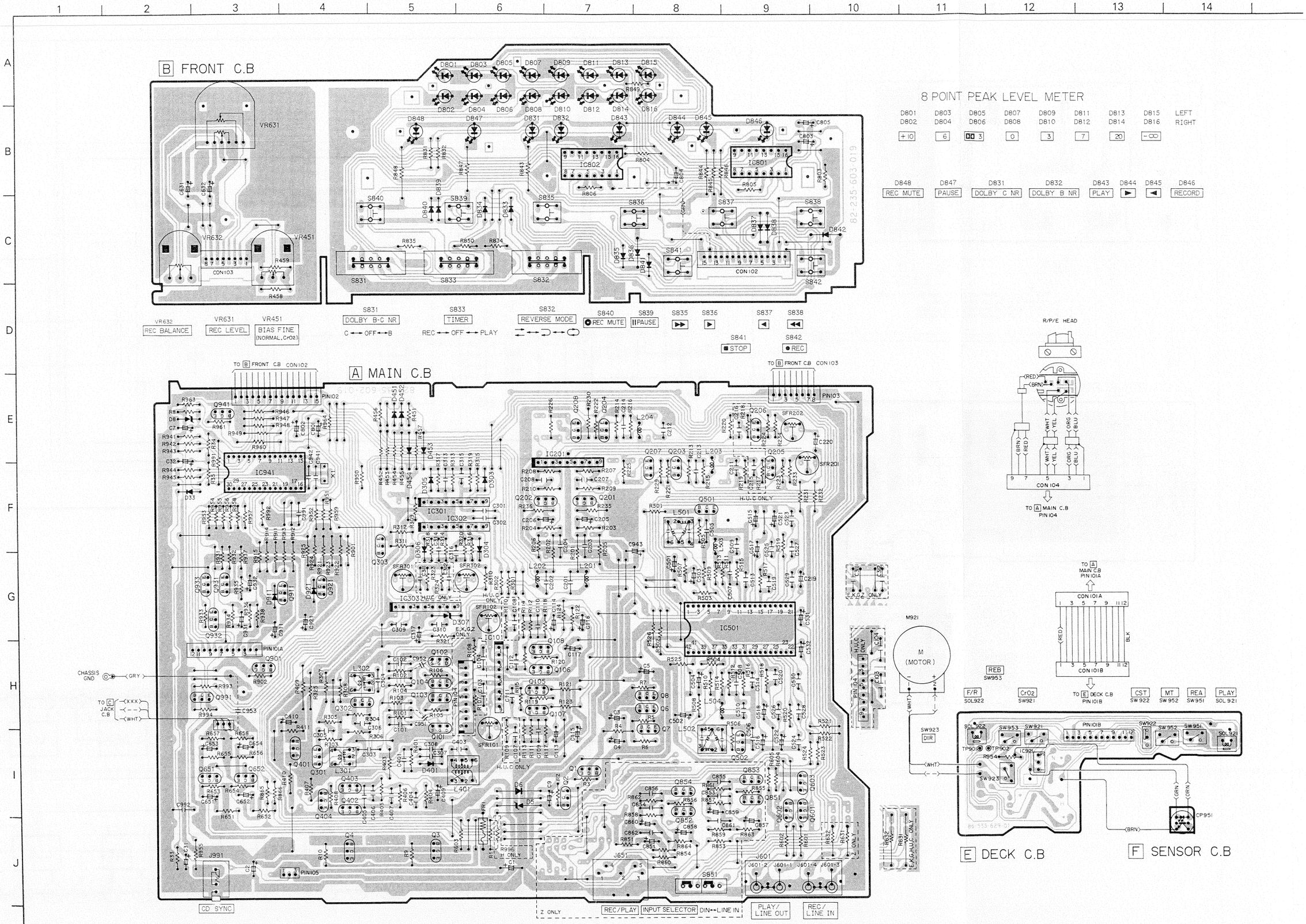
	H,C	E,K,G,Z	U
AD-F370/S37	26.4	27.5	26.4
AD-R470/R40	31.0	29.8	31.0

(AT REC)

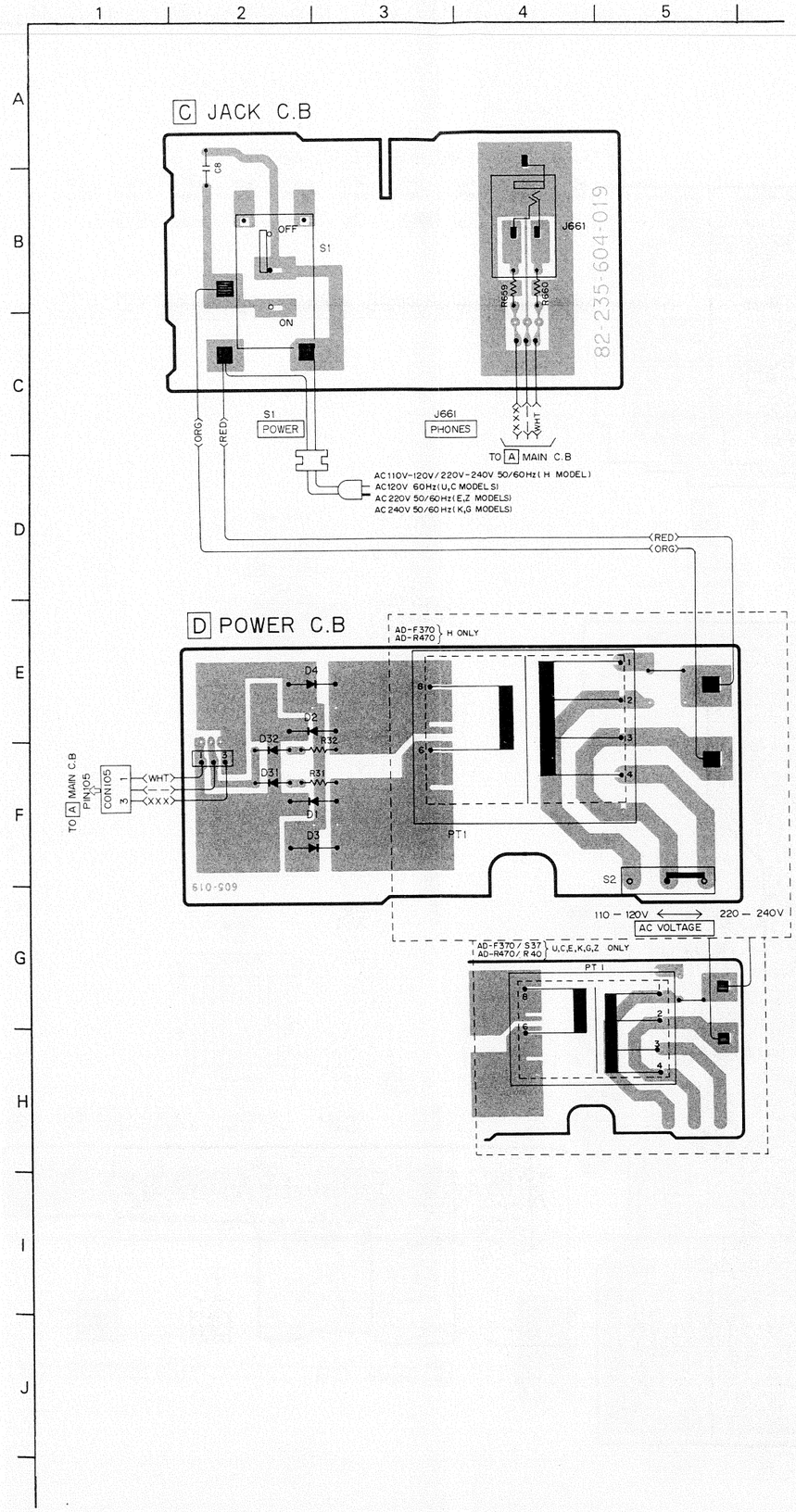
	H,C	E,K,G,Z	U
AD-F370/S37	10.1	10.5	10.1
AD-R470/R40	9.96	10.1	9.96

✱ ✱

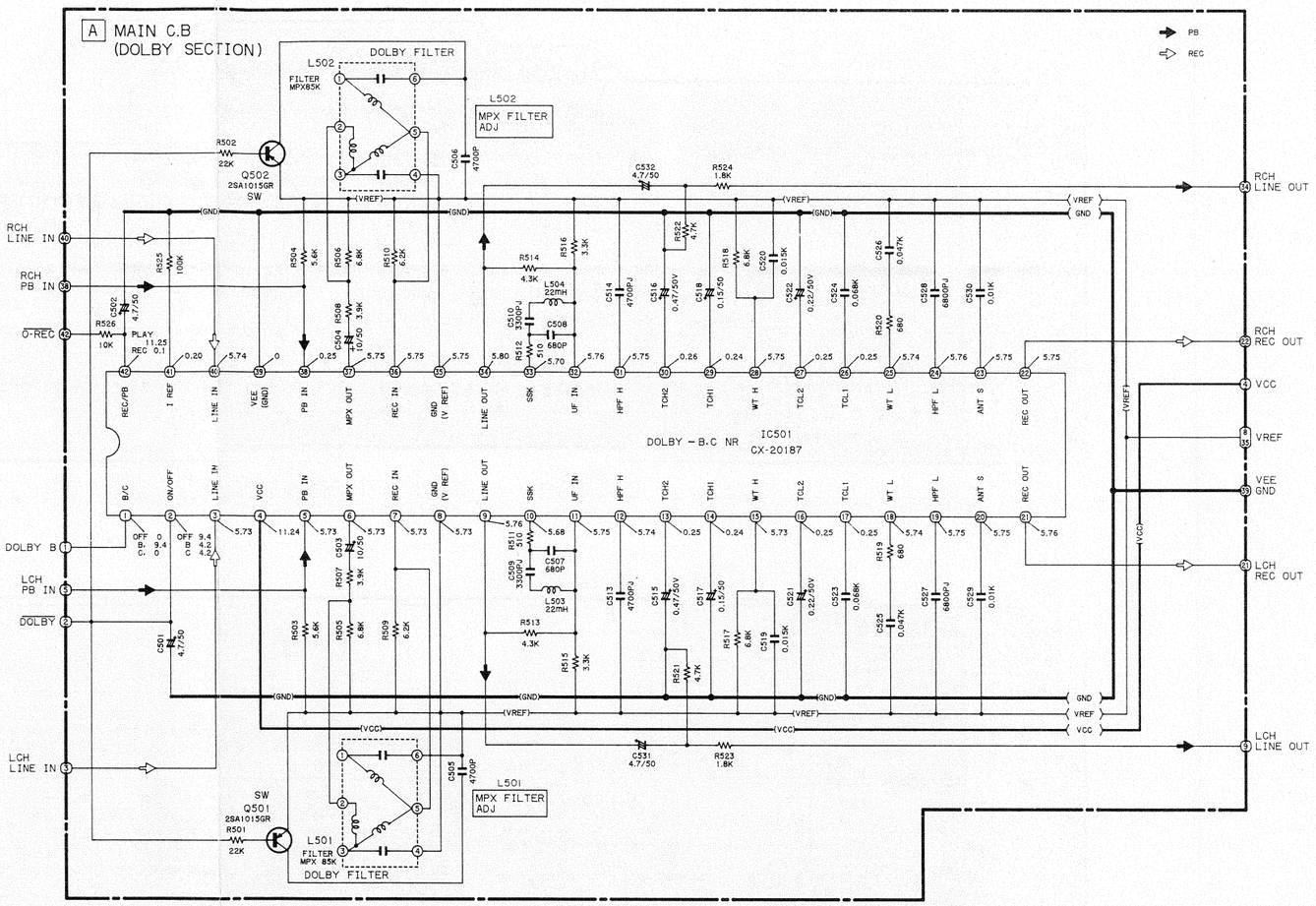
MODEL	TYPE	R451	R456	R457
AD-R470	H,C	22K	100K	10K
	E,K,G,Z	39K	47K	8.2K
AD-R40	U	22K	100K	10K
AD-F370	H,C	22K	33K	10K
	E,K,G,Z	22K	47K	15K
AD-S37	U	22K	33K	10K


B FRONT C.B
A MAIN C.B
8 POINT PEAK LEVEL METER
D801 D803 D805 D807 D809 D811 D813 D815 LEFT
D802 D804 D806 D808 D810 D812 D814 D816 RIGHT
+10 6 3 0 3 7 20 -∞
D848 REC MUTE
D847 PAUSE
D831 DOLBY C NR
D832 DOLBY B NR
D843 PLAY
D844 ▶
D845 ◀
D846 RECORD
VR632 REC BALANCE
VR631 REC LEVEL
VR451 BIAS FINE (NORMAL,CrO2)
S831 DOLBY B-C NR C ⟷ OFF ⟷ B
S833 TIMER REC ⟷ OFF ⟷ PLAY
S832 REVERSE MODE
S840 REC MUTE
S839 PAUSE
S835 ▶▶
S836 ▶
S837 ◀
S838 ◀◀
S841 ■ STOP
S842 ● REC
R/P/E HEAD
TO B FRONT C.B CON102
TO B FRONT C.B CON103
PIN102
PIN103
CON104
TO A MAIN C.B PIN104
TO A MAIN C.B PIN101A
CON101A
CON101B
TO E DECK C.B PIN101B
M921
M (MOTOR)
REB SW953
F/R SOL922
CrO2 SW921
CST SW922
MT SW952
REA SW951
PLAY SOL921
SW923 DIR
CHASSIS GND
TO C JACK C.B
CD SYNC
PIN105
REC/PLAY
INPUT SELECTOR DIN↔LINE IN
PLAY/ LINE OUT
REC/ LINE IN
E DECK C.B
F SENSOR C.B
82-235-603-019
86-535-629-01

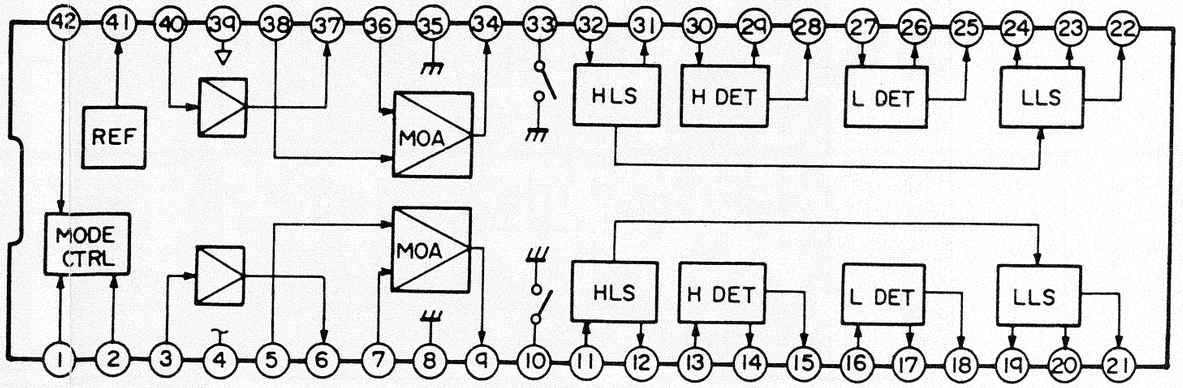
WIRING－2　(AD－R470,R40, AD－F370,S37)



SCHEMATIC DIAGRAM－2　(AD－R470,R40, AD－F370,S37)



IC BLOCK DIAGRAM－2　IC, CX20187



B FRONT C.B

VR632 REC BALANCE
VR631 REC LEVEL
VR451 BIAS FINE (NORMAL,CrO2)
S831 DOLBY B·C NR C ⟷ OFF ⟷ B
S833 TIMER REC ⟷ OFF ⟷ PLAY/REPEAT
S840 ● REC MUTE
S839 ❚❚ PAUSE
S835 ▶▶
S836 ▶
S838 ◀◀
S841 ■ STOP
S842 ● REC

8 POINT PEAK LEVEL METER

D801 D802	D803 D804	D805 D806	D807 D808	D809 D810	D811 D812	D813 D814	D815 D816	
+10	6	3	0	3	7	20	-∞	LEFT
								RIGHT

D848	D847	D831	D832	D844	D846
REC MUTE	PAUSE	DOLBY C NR	DOLBY B NR	PLAY	RECORD

A MAIN C.B

TO B FRONT C.B CON102
TO B FRONT C.B CON103
TO C JACK C.B (XXX / WHT)
CHASSIS GND (GRY)
Z ONLY
REC/PLAY INPUT SELECTOR DIN⟷LINE IN
PLAY/LINE OUT
REC/LINE IN

EH R/PH
CON104
TO A MAIN C.B PIN104

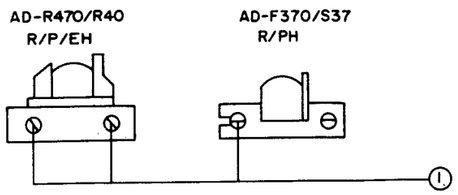
M921 M (MOTOR)

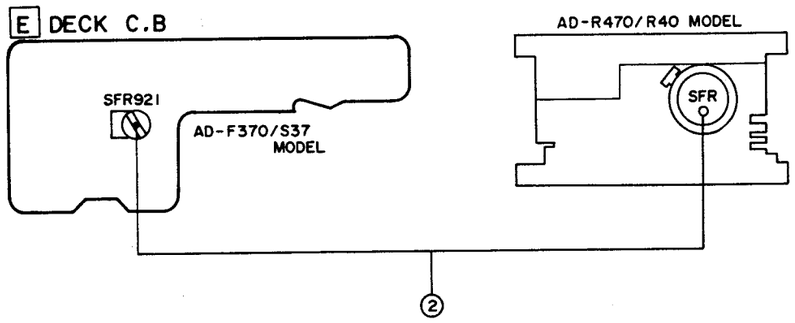
TO A MAIN C.B PIN101A
CO101A
CO101B
TO E DECK C.B PIN101B

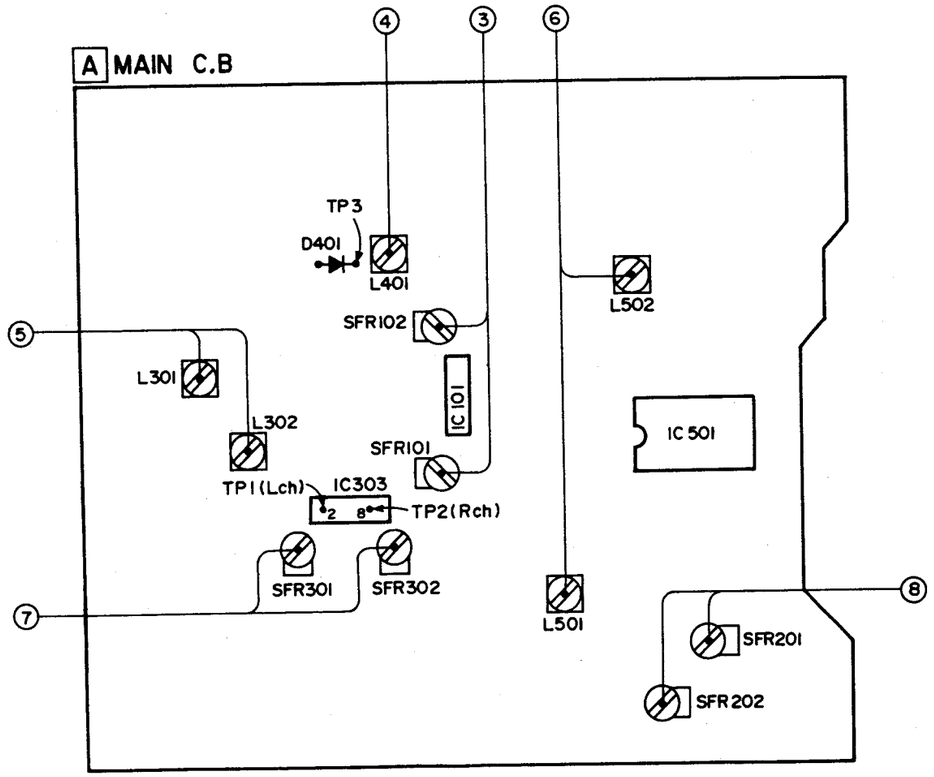
F/R SOL922 | CrO2 SW921 | CST SW922 | MT SW952 | REA SW951 | PLAY SOL921

E DECK C.B

ADJUSTMENT (AD−R470,R40, AD−F370,S37)







1. Azimuth Adjustment
   Settings : · Test tape : TTS-310 (TTA-317E)
   · Test point : LINE OUT (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
   DIN OUT (AD-F370/R470 Z ONLY)
   · Adjustment location : Azimuth adjustment screw
   Method : Playback the 10kHz signals of the test tape, and adjust the screw for maximum output.

2. Tape Speed Adjustment
   Settings : · Test tape : TTA-100 (TTA-111S)
   · Test point : LINE OUT (AD-F370/S37, AD-R470,R40 H, C, E, K, G ONLY)
   DIN OUT (AD-F370/R470 Z ONLY)
   · Adjustment location : SFR921 (AD-F370/S37)
   MOTOR SFR (AD-R470/R40)
   Method : Playback the test tape and adjust the SFR for frequency of 3,000Hz.

3. Playback Sensitivity Adjustment
   Settings : · Test tape : TTS-200 (TTA-161, TCC-130)
   · Test point : LINE OUT (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
   J601-1 (L-CH)
   J601-2 (R-CH)
   DIN OUT (AD-F370/R470 Z ONLY)
   J651
   · DOLBY NR SW : OFF
   · Adjustment location : SFR101 (L-CH)
   SFR102 (R-CH)
   Method : Playback the test tape and adjust so that output is 490 $\pm^{1}_{8}$mV.

4. Bias OSC. Coil Adjustment
   Settings : · Test tape : TTA-620 (TTA-119MP)
   · Test point : TP3
   · Adjustment location : L401
   · DOLBY NR SW : OFF
   Method : Adjust so that the frequency at the test points is 85kHz ± 200Hz.

5. HX Coil Adjustment
   Settings : · Test tape : TTA-600 (TTA-119K)
   · Test point : IC303(HX comparator), pin 2,8
   · Adjustment location : L301 (L-CH)
   L302 (R-CH)
   Method : Adjust so that the DC voltage at the test point is minimized in the REC STANDBY mode.

6. MPX Filter Adjustment
   Settings : · Test tape : Blank tape
   · Input signal : 19kHz signal at LINE IN
   · Test point : LINE OUT
   · Adjustment location : L501 (L-CH)
   L502 (R-CH)
   Method : Record the test tape, and adjust so that the output DOLBY B/C SW ON becomes up to 27dB for the output at DOLBY B/C SW OFF.

7. REC/PB Frequency Response Adjustment
   Settings : · Test tape : TTA-600 (TTA-119K)
   · Test point : LINE OUT (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
   J601-1 (L-CH)
   J601-2 (R-CH)
   DIN OUT (AD-F370/R470 Z ONLY)
   J651
   · Adjustment location : SFR301 (L-CH)
   SFR302 (R-CH)
   · DOLBY NR SW : OFF
   Method : Record and playback the 1kHz and 10kHz signals and adjust so the output difference becames +0.5 ± $\frac{0}{0.5}$dB (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
   -3 ± 3dB (AD-F370/R470 Z ONLY)

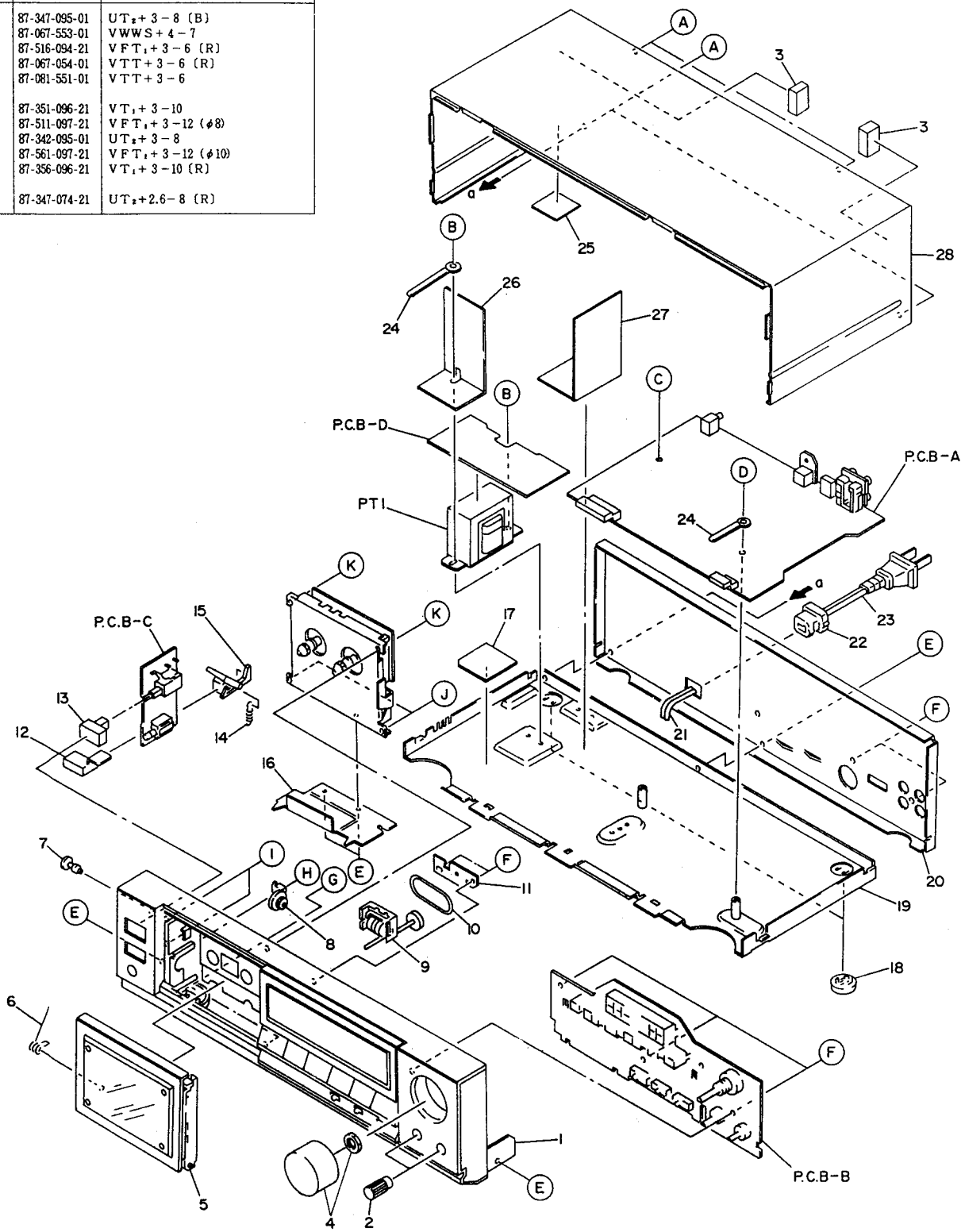
8. REC/PB Sensitivity Adjustment
   Settings : · Test tape : TTA-600 (TTA-119K) (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
   TTA-610 (TTA-119H) (AD-F370/R470 Z ONLY)
   · Test point : LINE OUT (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY)
   J601-1 (L-CH)
   J601-2 (R-CH)
   DIN OUT (AD-F370/R470 Z ONLY)
   J651
   · DOLBY NR SW : OFF
   · Adjustment location : SFR201 (L-CH)
   SFR202 (R-CH)
   Method : Record and Playback a 1kHz (AD-F370/S37, AD-R470/R47, H, C, E, K, G ONLY), 400Hz (AD-F370/R470 Z ONLY) signal and adjust so that the LINE, DIN output difference became 0 ± 0.3dB (AD-F370/S37, AD-R470/R40 H, C, E, K, G ONLY), 355 ± 50mV (AD-F370/R470 Z ONLY)

PRACTICAL SERVICE FIGURE (AD−R470,R40, AD−F370,S37)

Playback output: 〔TTS-200(TTA-161, TCC-130)〕	EXCEPT Z 470 ± 50mV (LINE OUT) Z ONLY 490 ± 50mV (DIN OUT)
PB/REC output: 〔TTA-600(TTA-119K)〕	EXCEPT Z 340mV ± 1.5dB (LINE OUT) Z ONLY 340mV ± 1.5dB (DIN OUT)
PB/REC distortion:	AD-R470, R40 AD-F370, S37 Less than 2.0% (NORM) AD-R470, R40 Less than 2.2% (CrO_2) AD-F370, S37 Less than 2.0% (CrO_2) AD-R470, R40 AD-F370, S37 Less than 2.0% (MT)
Playback noise:	AD-R470, R40 AD-F370, S37 Less than 4.0mV (DOLBY-B NR OFF, with NORM. tape) AD-R470, R40 AD-F370, S37 Less than 3.0mV (DOLBY-B NR OFF, with CrO_2 tape) AD-R470, R40 Less than 2.0/1.8mV (DOLBY-B/C NR ON, with NORM. tape) AD-F370, S37 Less than 2.2/2.0mV (DOLBY-B/C NR ON, with NORM. tape) AD-R470, R40 AD-F370, S37 Less than 2.0/1.8mV (DOLBY-B/C NR ON, with CrO_2 tape)
Erase ratio: (125Hz)	More than 60dB
PB/REC SN ratio: (Unweighted)	More than 38/44/44dB (DOLBY-NR OFF/B/C with NORM. tape) More than 40/46/46dB (DOLBY-NR OFF/B/C with CrO_2, MT. tapes)
(Weighted)	More than 44/52/62dB (DOLBY-NR OFF/B/C with NORM. tape) More than 46/54/64dB (DOLBY-NR OFF/B/C with CrO_2, MT. tapes)
Recording bias frequency:	85kHz
Tape speed: 〔TTA-100(TTA-111S)〕	3kHz ± 1.5%
Wow & flutter: (W. R. M. S)	Less than 0.065%
Take-up torque:	45 ± 10g-cm 〔0.44 ± 0.1mN・m〕
Fast forward torque:	120 ± 30g-cm 〔1.18 ± 0.29mN・m〕
Rewind torque:	120 ± 30g-cm 〔1.18 ± 0.29mN・m〕
Back-tension:	3 ± $^{2}_{1}$g-cm 〔0.03 ± 0.02mN・m〕
Test tape:	METAL TTA-620(TTA-119MP) CrO_2 TTA-610(TTA-119H) NORMAL TTA-600(TTA-119K)

EXPLODED VIEW－1

REF.NO.	PART NO.	DESCRIPTION
A	87-347-095-01	UT$_2$+3－8 (B)
B	87-067-553-01	VWWS+4－7
C	87-516-094-21	VFT$_1$+3－6 (R)
D	87-067-054-01	VTT+3－6 (R)
E	87-081-551-01	VTT+3－6
F	87-351-096-21	VT$_1$+3－10
G	87-511-097-21	VFT$_1$+3－12 (ϕ8)
H	87-342-095-01	UT$_2$+3－8
I	87-561-097-21	VFT$_1$+3－12 (ϕ10)
J	87-356-096-21	VT$_1$+3－10 (R)
K	87-347-074-21	UT$_2$+2.6－8 (R)

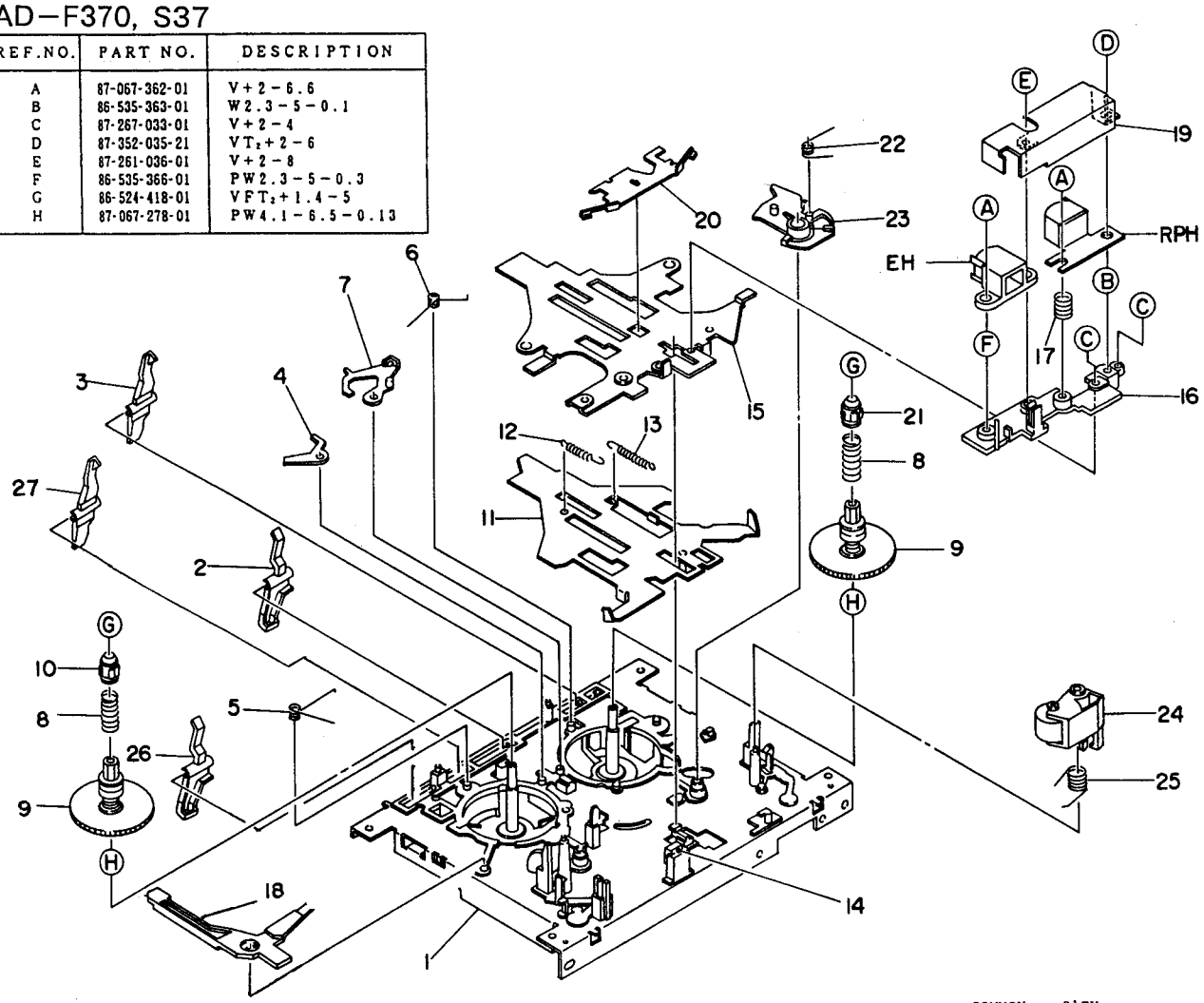


MECHANICAL PARTS LIST

PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	1-1	★09-047-383-010	CABINET FRONT ASSY (F370)	※	1
	1-1	★09-047-384-010	CABINET FRONT ASSY (S37)	※	1
	1-1	★09-047-398-010	CABINET FRONT ASSY (R470)	※	1
	1-1	★09-047-399-010	CABINET FRONT ASSY (R40)	※	1
	1-2	★82-234-018-010	KNOB, BIAS		2
	1-3	★84-711-306-019	G CUSHION 10-5-5		2
	1-4	★82-235-014-019	KNOB, REC	※	1
	1-5	09-047-385-010	CASSETTE BOX ASSY (H, C ONLY) (F370)	※	1
	1-5	09-047-387-010	CASSETTE BOX ASSY (U ONLY) (S37)	※	1
	1-5	09-047-386-010	CASSETTE BOX ASSY (E, K, G, Z ONLY) (F370)	※	1
	1-5	09-047-395-010	CASSETTE BOX ASSY (H, C ONLY) (R470)	※	1
	1-5	09-047-397-010	CASSETTE BOX ASSY (U ONLY) (R40)	※	1
	1-5	09-047-396-010	CASSETTE BOX ASSY (E, K, G, Z ONLY) (R470)	※	1
	1-6	★82-235-208-019	T-SPRING, EJECT	※	1
	1-7	★87-084-077-019	NYLON RIVET 3.5-4.5		1
	1-8	★87-063-143-010	OIL DAMPER 75		1
	1-9	★87-040-194-010	COUNTER		1
	1-10	★82-235-207-010	BELT, COUNTER	※	1
	1-11	★82-205-208-010	HOLDER, COUNTER		1
	1-12	★82-234-015-010	PUSH-KEY, EJECT		1
	1-13	★84-721-023-010	PUSH-BUTTON, POWER		1
	1-14	★82-235-206-019	E-SPRING, EJECT	※	1
	1-15	★82-235-202-019	LEVER, EJECT	※	1
	1-16	★82-235-209-010	PLATE, SHIELD HEAD (R470, R40)	※	1
	1-17	★82-231-615-010	SILICON STEEL 43-43 (F370, S37)		1
	1-18	★87-055-059-010	FOOT B		2
	1-19	---	CHASSIS, AMP.		1
	1-20	★82-236-005-019	PANEL, REAR (H ONLY) (F370)	※	1
	1-20	★82-236-006-019	PANEL, REAR (U ONLY) (S37)	※	1
	1-20	★82-236-007-019	PANEL, REAR (C ONLY) (F370)	※	1
	1-20	★82-236-008-019	PANEL, REAR (E ONLY) (F370)	※	1
	1-20	★82-236-009-019	PANEL, REAR (K ONLY) (F370)	※	1
	1-20	★82-236-010-019	PANEL, REAR (G ONLY) (F370)	※	1
	1-20	★82-236-011-019	PANEL, REAR (Z ONLY) (F370)	※	1
	1-20	★82-235-016-019	CHASSIS, REAR (H ONLY) (R470)	※	1
	1-20	★82-235-018-019	CHASSIS, REAR (U ONLY) (R40)	※	1
	1-20	★82-235-019-019	CHASSIS, REAR (C ONLY) (R470)	※	1
	1-20	★82-235-020-019	CHASSIS, REAR (E ONLY) (R470)	※	1
	1-20	★82-235-021-019	CHASSIS, REAR (K ONLY) (R470)	※	1
	1-20	★82-235-022-019	CHASSIS, REAR (G ONLY) (R470)	※	1
	1-20	★82-235-024-019	CHASSIS, REAR (Z ONLY) (R470)	※	1
	1-21	★87-830-814-019	TUBE UL 8φ-140mm (H, U, C ONLY)		1
	1-22	★87-085-199-010	CORD BUSHING		1
	1-23	★87-034-749-019	AC CORD (H ONLY) (F370, R470)		1
	1-23	★87-034-583-019	AC CORD (U, C ONLY) (F370, S37, R470, R40)		1
	1-23	★82-187-797-019	AC CORD (E, Z ONLY) (F370, R470)		1
	1-23	★82-187-796-019	AC CORD (K ONLY) (F370, R470)		1
	1-23	★82-187-795-019	AC CORD (G ONLY) (F370, R470)		1
	1-24	---	WIRE BINDER		2
	1-25	★82-226-274-010	DUMPER 80-60-3 (E, K, Z ONLY)		1
	1-26	★82-235-620-010	SILICON BOARD A2 (R470, R40)	※	1
	1-27	★82-104-212-010	SILICON BOARD A (R470, R40)		1
	1-28	★82-235-002-019	CABINET, STEEL	※	1

EXPLODED VIEW−2 (X−3 SR1UN, SR2UN)
AD−F370, S37

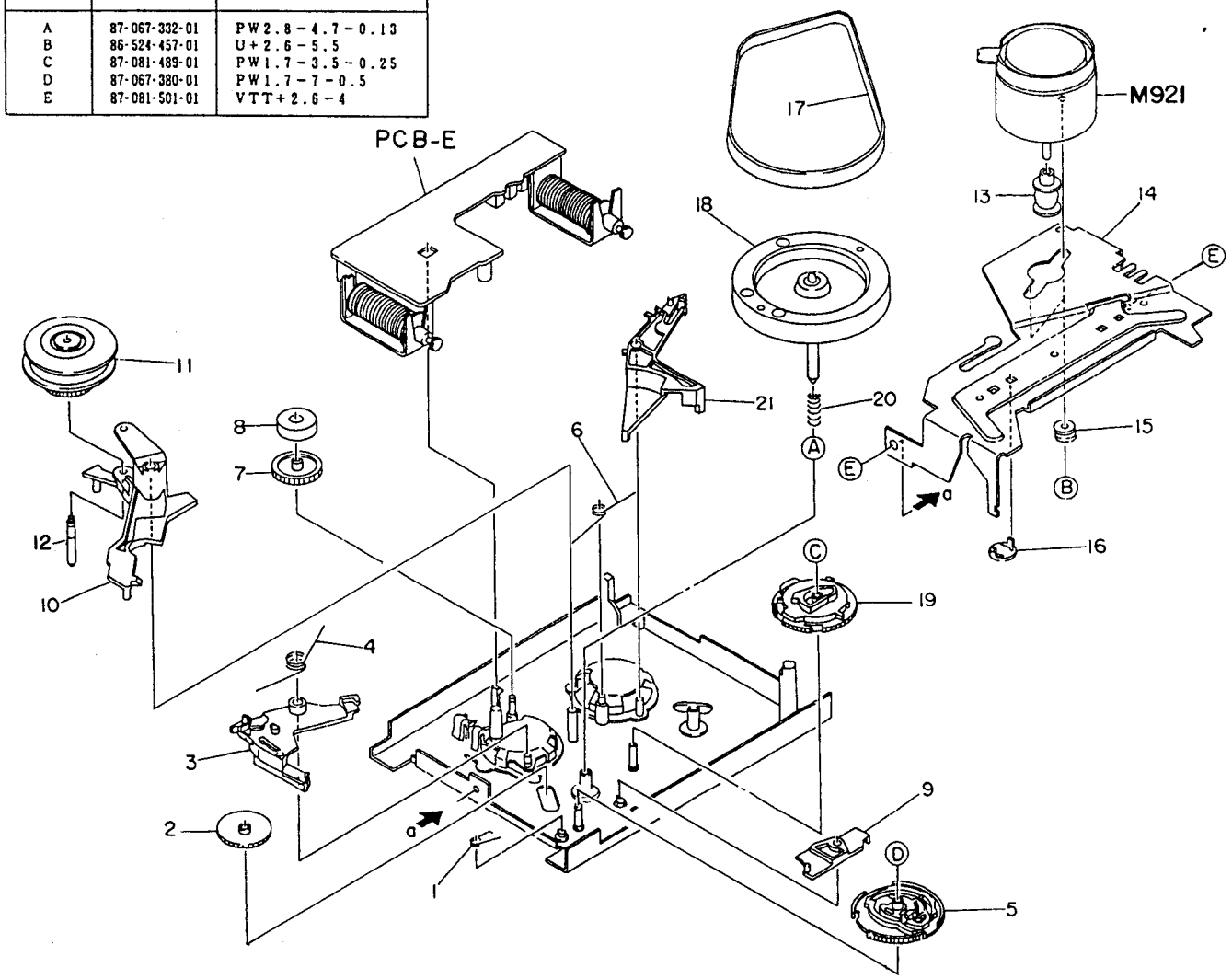
REF.NO.	PART NO.	DESCRIPTION
A	87-067-362-01	V + 2 − 6.6
B	86-535-363-01	W2.3 − 5 − 0.1
C	87-267-033-01	V + 2 − 4
D	87-352-035-21	VT_2 + 2 − 6
E	87-261-036-01	V + 2 − 8
F	86-535-366-01	PW2.3 − 5 − 0.3
G	86-524-418-01	VFT_2 + 1.4 − 5
H	87-067-278-01	PW4.1 − 6.5 − 0.13



PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	2-1	★86-535-339-310	MECHANISM CHASSIS ASSY S		1
	2-2	★86-535-249-110	LEVER, CASSETTE S		1
	2-3	★86-535-254-110	LEVER, CHROME		1
	2-4	★86-535-252-210	LEVER, BRAKE R		1
	2-5	★86-535-371-019	T−SPRING, BRAKE R		1
	2-6	★86-535-370-019	T−SPRING, BRAKE F		1
	2-7	★86-535-251-010	LEVER, BRAKE F		1
	2-8	★86-535-293-019	C−SPRING, REEL PLATFORM		2
	2-9	86-535-240-110	REEL PLATFORM A ASSY		2
	2-10	★86-524-218-119	STOPPER S, REEL PLATFORM		1
	2-11	★86-535-385-210	SLIDE PLATE S ASSY		1
	2-12	★86-535-285-019	E−SPRING, SLIDE		1
	2-13	★86-535-286-019	E−SPRING, ACTUATING		1
	2-14	★86-535-353-010	FELT 5−4−2		1
	2-15	★86-535-311-310	ACTUATING CHASSIS S		1
	2-16	★86-535-314-010	BASE, HEAD		1
	2-17	★86-535-359-010	C−SPRING, AZIMUTH S		1
	2-18	★82-235-204-010	LEVER, PROTECT		1
	2-19	★86-535-362-010	PLATE, HEAD SHIELD		1
	2-20	★86-535-289-010	P−SPRING, ACTUATING		1
	2-21	★86-524-233-119	STOPPER T, REEL PLATFORM		1
	2-22	★86-535-282-019	T−SPRING, PLAT GEAR F		1
	2-23	★86-535-238-110	LEVER, PLAY F		1
	2-24	86-535-226-110	PINCH LEVER F ASSY		1
	2-25	★86-535-312-010	T−SPRING, PINCH S		1
	2-26	★86-535-247-210	LEVER, REC A		1
	2-27	★86-535-250-010	LEVER, METAL		1

EXPLODED VIEW—3 (X—3 SR1UN, SR2UN)
AD—F370, S37

REF.NO.	PART NO.	DESCRIPTION
A	87-067-332-01	PW2.8-4.7-0.13
B	86-524-457-01	U+2.6-5.5
C	87-081-489-01	PW1.7-3.5-0.25
D	87-067-380-01	PW1.7-7-0.5
E	87-081-501-01	VTT+2.6-4



PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	3-1	★86-535-291-110	T-SPRING, FR CAM		1
	3-2	86-535-259-310	GEAR, PLAY		1
	3-3	★86-535-230-210	LEVER, TRIGGER FR		1
	3-4	★86-535-278-019	T-SPRING, FR		1
	3-5	★86-535-261-310	CAM, FR P		1
	3-6	★86-535-279-010	T-SPRING, MAIN		1
	3-7	86-535-258-310	GEAR, IDLER		1
	3-8	★86-535-614-010	RING, MAGNET (4P)		1
	3-9	★86-535-223-310	LEVER, PAUSE		1
	3-10	★86-535-233-010	LEVER, FR		1
	3-11	★86-535-301-010	SLIPDISC ASSY		1
	3-12	★86-535-235-010	SHAFT, FR		1
	3-13	★86-535-389-110	PULLEY, MOTOR C		1
	3-14	---	HOLDER, MOTOR		1
	3-15	★86-513-441-110	COLLAR		2
	3-16	★86-535-255-010	FLYWHEEL TABLE		1
	3-17	86-535-391-110	BELT SC		1
	3-18	86-535-264-010	FLYWHEEL F ASSY		1
	3-19	★86-535-260-310	CAM, MAIN		1
	3-20	★86-535-288-019	C-SPRING, FLYWHEEL		1
	3-21	★86-535-231-210	LEVER, TRIGGER PLAY		1

See the X-3 Mechanism Guide (Supplement of Service Manual) for the exploded views.
The following parts have been changed for this model.

AD−R470,R40
ALTERATION PARTS LIST

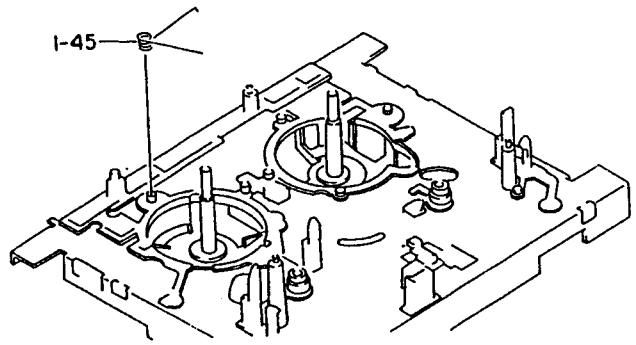
PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	1-11	★86-535-370-019	T−SPRING, BRAKE F		1
	1-20	★86-535-351-310	HEAD CHASSIS PH ASSY		1
	1-23	★86-535-356-010	HEAD HOUSING PH ASSY		1
	1-44	★86-535-353-010	FELT SQ 5−4−2		1
	2-13	★86-535-389-010	PULLY MOTOR C 1		1
	2-17	86-535-390-010	BELT RC		1

The following REF. NOS are not used in this model.
1-4, 1-35, 2-9

ADDITIONAL PARTS LIST

PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	1-45	★86-535-371-019	T−SPRING, BRAKE R		1

EXPLODED VIEW



■ ACCESSORIES/PACKAGE LIST
AD−F370,S37

PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	1	★82-236-904-019	INSTRUCTION BOOKLET	※	1
	2	★87-032-845-019	SIEMENS PLUG (H ONLY)		1
	3	★87-034-773-010	CORD PIN, R−237W−1M		2

AD−R470,R40

PART NO. CHANGED TO	REF. NO.	PART NO.	DESCRIPTION	COMMON MODEL	Q'TY
	1	★82-235-904-019	INSTRUCTION BOOKLET	※	1
	2	★87-032-845-019	SIEMENS PLUG (H ONLY)		1
	3	★87-034-773-010	CORD PIN, R−237W−1M		2